Conditions

Triangle ABC with side AC extended through D, m<A=37 and m<BCD=117. Which side of triangle ABC is the longest side? Justify your answer

Solution

The longest side in triangle is always opposite to a biggest angle.

$\angle BAC = 37°, \angle BCD = 117°$

$\angle BCD$ is the exterior angle, so $\angle BCA = 180 - 117 = 63°$

And

$\angle ABC = 180 - \angle BCA - \angle BAC = 180 - 63 - 37 = 80°$

The biggest angle is $\angle ABC$. That's why the largest side is AC.